



US005636275A

United States Patent [19]

Takagi et al.

[11] **Patent Number:** 5,636,275[45] **Date of Patent:** Jun. 3, 1997

[54] **HINGE MECHANISM AND FOLDABLE PORTABLE TELEPHONE HAVING THE HINGE MECHANISM**

64-59992 3/1989 Japan .
5-263563 10/1993 Japan .

[75] **Inventors:** Hisamitsu Takagi; Takahiro Agai; Tatsuzi Shigeta; Shigeru Takahashi; Yosiaki Kato, all of Kawasaki, Japan

Primary Examiner—Jack K. Chiang
Attorney, Agent, or Firm—Helfgott & Karas

[73] **Assignee:** Fujitsu Limited, Kanagawa, Japan

[21] **Appl. No.:** 598,209

[22] **Filed:** Feb. 6, 1996

[30] **Foreign Application Priority Data**

Mar. 31, 1995 [JP] Japan 7-076761
May 30, 1995 [JP] Japan 7-132302

[51] **Int. Cl.⁶** H04M 1/00

[52] **U.S. Cl.** 379/433; 379/434

[58] **Field of Search** 379/433, 434, 379/428; 455/89, 90; 16/342, 325

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,822,965 4/1989 Hyogo et al. .
5,274,882 1/1994 Persson .
5,354,028 10/1994 Kitamura 16/342

FOREIGN PATENT DOCUMENTS

0374721 6/1990 European Pat. Off. .

[57] **ABSTRACT**

A hinge mechanism for use in a portable telephone in which a foldable lid is rotatably supported by the hinge mechanism to rotate the foldable lid between an opened position and a closed position, includes a rotary shaft on which the lid is rotatably supported. A first spring, fitted to the shaft, generates a biasing force to rotate the lid on the shaft in a first direction from the closed position to the opened position. A second spring, fitted to the shaft, generates a biasing force to rotate the lid on the shaft in a second direction opposite to the first direction after the lid is further rotated from the opened position in the first direction. A first stopper restricts a rotation of the shaft in the first direction to cancel the biasing force of the first spring when the lid is further rotated on the shaft in the first direction from the opened position. A second stopper restricts a rotation of the shaft in the second direction to cancel the biasing force of the second spring when the lid is rotated on the shaft in the second direction back to the opened position after the lid is further rotated in the first direction from the opened position.

25 Claims, 46 Drawing Sheets

